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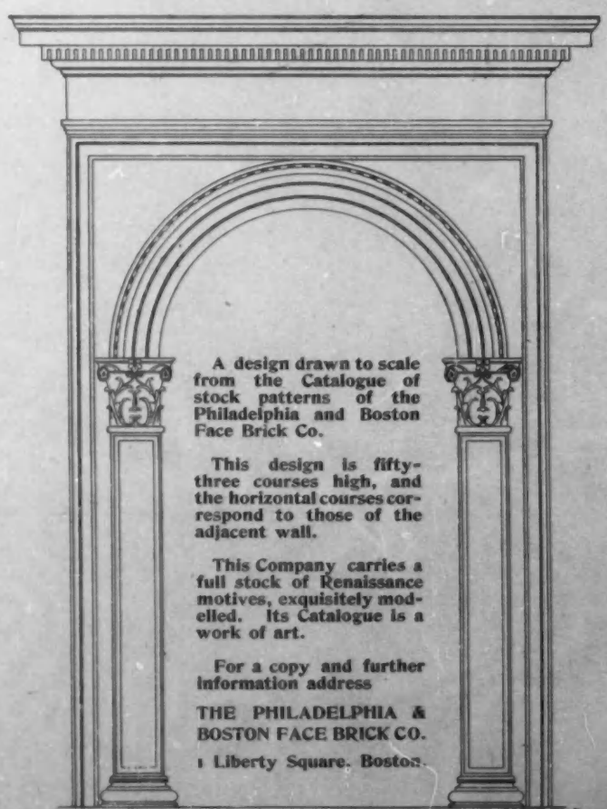

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The Brickbuild

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THE BRICKBUILDER.

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Among the improvements in many directions which have characterized the architecture of this country during the last ten or fifteen years, perhaps none is more marked than the rapid advance that has been made in the use of brick and terra-cotta. Until recently, with us, brick was used as a rule merely because it was cheaper than stone, and generally with little or no attempt at decorative effect. In fact, the material seems to have been regarded as so hopeless a one in which to obtain architectural effect that hardly any regard was paid even to mass and proportion, or the relation of voids to solids, still less to detail. There were, indeed, a few notable exceptions, which served however only to emphasize the rule.

As the number of educated architects increased in the community, men who were more or less familiar with what had been and what was being accomplished in this and other respects in Europe, it was but natural that more attention should be given to the great possibilities of the hitherto despised material. The hints furnished by the clay architecture of England, the Netherlands, and especially of Italy, were eagerly made use of, and have led already to the production of a number of characteristic and admirable examples of brick architecture, which, while suggested by European precedents, have a distinct individuality of their own. The brick and terra-cotta manufacturers have not been slow in supplying the demand which the architects have created, and have furnished them with moulded brick and ornamental terra-cotta in the greatest variety, so much so that the very profusion has been a danger in the hands of the weaker designers. While the enterprise of our brick manufacturers has enabled our architects to accomplish what they have, it is not surprising, indeed it was to have been expected, that the rapidity with which the new field was entered upon should have produced much slipshod and slovenly detail, and much misuse of fairly good detail, as well as some really admirable work. Though much has been accomplished, much more remains to be done before a thoroughly satisfactory and characteristic brick architecture is produced, and the prospect in advance is endless.

One difficulty that has prevented the development of our brick architecture, thus far, from being as satisfactory as it might have been, is the want of contact between the architect and the brick manufacturer. One of the many advantages of brickwork is its economy; but if a special set of mouldings has to be made for each building, this advantage is largely and needlessly thrown away. Yet often the architect has been reduced to adopt this course or injure his building by poor detail, where good detail need not have been more expensive. On the other hand, the architect has not had full opportunity for familiarity
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have the interest of this advance at heart. It is not trying t share
in any way regions of technical journalism already occupied. It
proposes to attempt to fill an unoccupied gap, and bespeaks the
hearty support and co-operation of its fellow journals, both those
which, on the one hand, occupying a wider field, cannot, in their
larger view, give to the specialty the special attention which it
requires; and, on the other, those which are devoted merely to the
technical side of brick manufacturing, and which, therefore, do not
reach the architects.

We have already pointed to the existence of faults and shortcomings in our brick architecture. One of the tasks which THE BRICKBUILDER proposes to itself is the criticism of current brick architecture, both in general and detail, with a view to aiding in the improvement, both of the designing of brick buildings and the details of brickmakers' catalogues.

Editorials and reviews by competent critics, who have made a special study of the subject, will point out what seems to be good and what seems to need correction in current work, bearing in mind especially the characteristics of the material and the kind of effects that are to be sought in its use, and pointing out the particular dangers to be avoided. Brick is recognized as the most durable of all building materials, but its great æsthetic possibilities are too often overlooked, and THE BRICKBUILDER believes brick architecture to be capable of a much higher development than it has yet received in any country. Whether or not such a development is yet possible with us, it does not stop to inquire, but it will do all in its power to further an advance that may tend in that direction. While proposing to give especial attention to brickwork, the new journal will not neglect terra-cotta, which is the natural material for the more elaborate decoration of brick buildings, but will give especial attention to consideration of its proper use and treatment.

As an aid toward future advance THE BRICKBUILDER will show what has been done in past ages with clay as a building material, by publishing measured drawings and sketches of old work; articles of a historical nature, and essays, letters, etc., from architects studying the subject abroad.

The modern work will be shown largely by working drawings from the architect's office, of buildings in course of construction, or of recent erection, and by photographs. In the reading matter, items of current interest; descriptions of special buildings; correspondence from leading cities; reports of new processes of manufacture, and new applications will cover what is being done at the present day with clay as a building material.

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, in general, the journal it is proposed to issue. While it
e devoted to clay architecture, broadly speaking, it will give special attention to the use of bricks for architectural decoration, partly because this is the most common application of clay to building purposes, and partly because it seems that the greatest possibilities for future work lie in this direction. There have been true and logical "brick styles," and if architects will work on the same principles that governed their development, why should they not succeed in developing an equally vital American brick architecture?

The sixth annual convention of the National Brick Manufacturers' Association was an interesting and useful one. At all such conventions sociability is apt to seem to have the upper hand, but the solid results that flow from these meetings are more apparent in the long run than at any particular moment. But the meetings were earnest and the discussions full of practical suggestion. In its six years of life the association has more than justified its existence. It counts within its ranks the large majority of the progressive brick manufacturers, and there is every reason for it to look forward to a career of increasing usefulness. Among the discussions, that on the mixture of clays was, perhaps, the most interesting and fruitful, although Mr. Robert Lyle, of Woodbridge, N. J., who was to have read a paper on this subject, was unable to do so. The discussion suggested that the qualities and characteristics of different clays need careful scientific investigation.

In the course of this discussion Mr. Jas. Taylor, of New York, recognized the fact that "there are a great many architects who are beginning to drop these mechanical brick (pressed brick), and they are building buildings of first-class common brick, and they look better and more artistic." We venture to predict that the use of common brick will constantly increase, and for the reasons which Mr. Taylor gives.

The question of mixing clays of different kinds to produce different colors and different qualities in brick was interestingly treated by Mr. Fiske, of Boston (who stated that he was working twenty different colors in his factory), Mr. Eudaly, of Cincinnati, and others.

A suggestion was made by one member which, if not worthy of adoption, at any rate deserved more consideration than it apparently received. It was as follows: —

"I would like to make one suggestion in regard to making brick — that is, pressed brick. Pressed brick are all made one size at present, and when the bricklayer lays them he lays them all one way. The pressed and common brick are not bound together by laying the pressed brick crosswise as a binder, and the consequence is that all pressed brick fronts crack and shift away from the common brick; that has been my experience.

"My suggestion would be to make a pressed brick the same length as it is now, but just double the width or a little more, to make the exact width of a nine-inch wall. That kind of a brick would, in my opinion, strengthen the wall.

"Six or seven rows of brick could be laid, and the seventh or eighth row the double-width brick could be used as a binder. In that way, when the front of a house is finished it is well bound together, and the long side of the brick is only visible. I hope my suggestion will receive consideration, and that the double brick will be manufactured and put on the market."

The method suggested would undoubtedly greatly improve the pressed-brick front wall, as regards strength. It would not help its present uninteresting monotony as regards beauty. It would be better to make the pressed brick of such size that it would bond with the common brick.

The association did well when, in 1887, it adopted a standard size for common brick ($8\frac{1}{4} \times 4 \times 2\frac{1}{4}$); it would have done better if it had made the standard size for pressed brick the same, instead of a little larger ($8\frac{3}{8} \times 4\frac{1}{8} \times 2\frac{1}{4}$), so that they could without difficulty be bonded together. Possibly the idea in making the standard for pressed brick larger was that they might be laid with narrower vertical joints and used with the common brick. But in practice the variation makes the laying of a face wall bonded with the backing so troublesome that it is rarely, if ever, done, with the result spoken of by the suggester. A uniform standard size is best, and those pressed-brick companies who have adopted the common brick standard for their pressed brick are to be commended. It remains for other pressed-brick manufacturers to follow suit, and to make such agitation among the makers of common brick as shall make the present undersized brick a thing of the past.

Among recent brick buildings in Boston two stand out with especial prominence, on account not only of their inherent interest and importance, but from their juxtaposition on a prominent site. It is not often nowadays that two buildings of such unusual interest are built simultaneously side by side. We refer to the Youth's Companion building, on the corner of Columbus Avenue and Berkeley Street, and the Pope building next to it on the avenue. There is an excellent reproduction from a photograph of the latter building in the *Inland Architect* for this month (January), and we learn that elevation and details are to be published in the February number of *The Architectural Review*. In a future number of THE BRICKBUILDER it is hoped that the Youth's Companion building will be adequately illustrated. The two buildings are an interesting contrast, and while they mutually help each other, — which unfortunately can rarely be said of contiguous buildings in our streets, — they provoke comparison.

The smaller (the Pope building), by Messrs. Peabody & Stearns, is of light buff brick with trimmings of cream-colored terra-cotta. The doorway and what little stonework there is on the ground story is of light Ohio sandstone. Above this, all mouldings and decorative members are in the nearly white terra-cotta. The detail is refined and carefully studied and very rich. The ensemble is in most respects beautifully proportioned; but in the cornice the slight projection which the material called for seems to have been overlooked, with the result that the cornice is somewhat too light for the building. It should have been higher in order to have the requisite weight and dignity. Had it been a stone cornice, with the amount of projection which such a cornice would naturally have in stone,

its height would have probably been just right. The height of the upper story, on the other hand, seems somewhat too high in proportion to the rest of the building. Greater height added to the cornice and robbed from this story would have greatly improved the proportion of the whole. But the most regrettable thing about this building is that, architecturally, it is a mere façade. You turn the corner, and all the rich decorations, even the cornice and the strings, suddenly cease. There is nothing but a blank, uninteresting wall of yellow brick. We could gladly have dispensed with much of the rich decoration of the front (which, in view of the baldness of the sides, we are almost tempted to call overloaded) to have had the satisfaction which would have resulted from an architectural treatment of the whole. The façade is so detached from the blankness behind it, that it seems to lack support, and the fault, which unfortunately is the rule of most of our street architecture, is in this case made more apparent by the satisfying solidity of the neighboring building, whose conspicuous virtue it is to be treated as a whole. The cornices and strings run all around, even into the narrow alley that separates it from the Pope building, so that the great block tells to the eye as a massive and satisfying whole. Messrs. Hartwell & Richardson are to be congratulated in having given us in the Youth's Companion building, perhaps, all things considered, the most successful business block (from an architectural point of view) in the city of Boston. As the façade of the Pope building is a conspicuous and charming example of the use of terra-cotta with brick, so the Youth's Companion building is an unusually fine example of what is possible in brick architecture. Had the rich, mottled, russet brick been used throughout, instead of being supplanted by brownstone in so much of the lower story as is not glass, we think the building as a whole would have gained greatly. And in this case the brownstone strings in the upper stories, which are doubtless called for by the brownstone in the first story, would have been also of brick and would have received a treatment more in harmony with the rest of the building. At present their detail is somewhat heavy. The only other point we are inclined to criticise is the spotty and ineffective terra-cotta decoration in the spandrils of the third-story arches. It has not been well calculated for the height at which it is seen, nor the material in which it is executed. But the proportions of the building as a whole are so excellent, and the detail as a rule so good, that we should hesitate to point to those features which seem less successful, were we not convinced that careful and honest criticism is much needed just now as an aid to further advance in our architecture. We must not close this notice without pointing to the especially successful treatment of the cornice, which, by its great height, and boldly, yet architecturally treated, detail, secures, even with the slight projection which the material calls for, the massiveness required in the crowning member of so massive a structure.

A somewhat amusing example of the extent to which the "spoils" view of the civil service has extended itself to everything connected in any way with public administration, is furnished by the demand of the stone men that the mayor of Boston instruct the city architect to use more stone in his buildings and to stop using so much brick and terra-cotta. The idea that the stone dealers or any other dealers have any right to "a share" in city work regardless of public good would be ludicrous if it did not indicate to what a serious extent the pernicious "spoils" idea has eaten its way into the public mind. To any sane person, not personally interested, it should be obvious that the question of what is best for the public buildings is the only consideration that should be permissible. We may take occasion at another time to refer at length to the interesting manner in which the city architect of Boston is developing the use of brick and terra-cotta.

A FEW NEGLECTED CONSIDERATIONS WITH REGARD TO BRICK ARCHITECTURE.

It is a recognized canon of good design that the characteristic qualities, capabilities, and limitations of any material in which a design is to be carried out must shape and modify the design itself, and that the best results are generally obtained when these qualities, and often the very limitations, are made to suggest the ultimate form. Perhaps in the use of no material is this well-known rule more often nowadays disregarded than in the use of brick, although in the magnificent brick buildings of Lombardy and the Netherlands, which confessedly have inspired our work, the guiding power of this rule is constantly evident, though it was probably instinctively felt rather than consciously formulated. But all our modern design is necessarily more or less self-conscious, and the careful and reasoned investigation of the laws of design is, therefore, if we would do our best, a necessity, though doubtless often an irksome one. It is well to remember that our very self-consciousness makes the transgression of these laws the more repulsive in its results, since they never can have the charm of naïveté.

It cannot be denied that there have been great advances of late in the brick architecture of this country, and great additions have been made to the brick materials at the disposal of the architect, until there are now a great variety of bricks of unusual color (sometimes good and sometimes bad) and of widely different shapes and sizes. Probably never had the brick designer such a variety of material from which to choose.

But while this development has gone on, there has been but little corresponding advance in the use of the commoner materials; partly owing to a want of careful consideration on the part of designers of the various elements of brick design, the special and necessary characteristics of brick construction by means of which effects should be sought, and partly owing to obstacles which, by ill-considered and unsystematic methods of manufacture and vicious habits of craftsmanship, are unnecessarily and often unwittingly thrown in the way of the free and untrammelled use of the commoner materials. A want of due regard to the same laws has often prevented good results from being obtained by the use of the more unusual brick forms which have lately become so fashionable. Every one of discrimination can recall instances in which this disregard has produced worse results than could have been obtained (other things being equal) by a straightforward and simple use of the commoner materials. We do not now refer to the general laws which govern all good design, but to the particular laws which from the very nature of the case, and growing out of the peculiarities and special characteristics of the material, must obtain in all brick designs. A want of regard to these special laws has, we repeat, often marred or seriously injured otherwise good designs, and made the use of expensive forms or qualities of brick worse than useless. It is not maintained that these laws and limitations are never considered, but that instances are rare in modern design in which they all receive the close attention which they deserve and which alone will lead to the best results.

It may be worth while, then, to consider some of the characteristic qualities of brickwork, even though in so doing it will be necessary to make statements that will be but truisms.

A brick building is necessarily made up of small parts. This is perhaps constructionally the quality which most distinguishes a brick building from buildings of other material. In applying, then, to brick buildings the rule of design referred to at the beginning of this paper, it is obvious, that the small pieces of which the design is constructionally made up must be recognized in the design itself, if the best and most characteristic result is to be produced. Large members made up of small pieces should therefore be avoided; they only call attention unpleasantly to the necessary limitations of the material, and make what should be a source of excellence into a shortcoming. The design itself, then, should be made up of small units as the unit of construction itself is small, nor need this produce any unquietness of effect. Recognizing, however, that a sparkling and brilliant effect is most easily obtained by the use of these small units, this should be the effect aimed at, and the decoration therefore should be concentrated upon certain points of the design. This rule is apt to produce the best effects, no matter what the material, but it should especially be regarded when dealing with brick. In brick design, then, the wall surfaces should generally be kept broad and quiet, and decoration should be confined as a rule to cornices and strings, doors and windows, though even the windows are often best when least decorated

The small unit of construction has the most marked influence on the design of the cornices, which, owing to this fact, can have comparatively slight projection, and must therefore make up in height what they lack in projection to be equally effective. This is a point which is often overlooked in brick designs. Cornices are designed in elevation, as if the projection were to be that of stone. The exigencies of construction require them to be flattened, and the result is a meagre and inadequate crowning member to the building. Many of the palaces of Bologna afford striking examples of the great beauty of well-designed brick cornices, which crown their buildings quite as effectively as the more projecting but lower cornices proper to stone design. An observance of the same law will lead to the prevailing use of surface patterns, where enrichment is desired, instead of those of bold projection. These patterns have a beauty and effectiveness all their own, and their variety is endless.

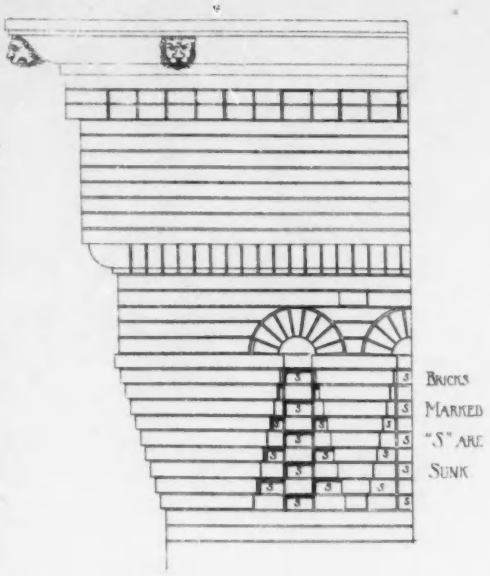
A similar consideration will suggest that the joints of brickwork should be emphasized rather than disguised. They should be regarded as an element of design to be used, not a defect to be covered up. Laying brick with very close joints is rarely, if ever, effective; it produces a stiff and mechanical, rather than an artistic and beautiful effect, and it deliberately throws away a feature that may be made of interest, while it cannot be wholly hidden; yet the common practice is to treat a joint as if it were something to be ashamed of. But the size of joints is a question that needs to be determined in each case by the exigencies of the particular design, and should be recognized as being as much a question of design as a question of construction.

Designers are apt to take the size of brick for granted. Indeed they cannot often help themselves, but are obliged to rest content with such sizes as the manufacturer places at their disposal. Yet the size and proportion of the brick must of necessity affect the design. In the first place it affects its scale. To convince ourselves of this, we have but to compare the differing scale of our brick buildings, built of brick that average about 8 x 4 x 2½ inches, with the English brick buildings with brick averaging when laid 9 x 4½ x 3 inches, or still more strikingly, with the so-called Pompeian brick recently in vogue 12 x 4 x 1½ inches. These last are often very effective, and it does not need to be pointed out how much their size and shape affect the appearance of the building. In choosing a brick it is rare, that enough consideration is given to the questions of size and proportions, and suitability to the design in hand. Often, indeed, this question is left to be determined after the drawings are made, when it ought to receive early consideration. The long, narrow brick with its closely drawn horizontal lines, will add to the horizontality of the building and therefore modify the proportion of the design as a whole. The use of bricks of different sizes in different parts of the same design can, if judiciously managed, be made to assist the proportions as well as to lend an added element of interest. But every such special use of brick needs to be attempted with care, and must be guided by the truest artistic feeling or it will result in disaster. Indeed every such opportunity for effect adds opportunity for mistake — is an added source of possible failure as well as of possible success. Brick manufacturers, as well as brick designers, need to pay more attention to the size of brick. As will be pointed out further on, the present almost entire absence of any standard brick size is a serious obstacle to the free use of combinations of different brick which could otherwise often be employed with excellent decorative effect.

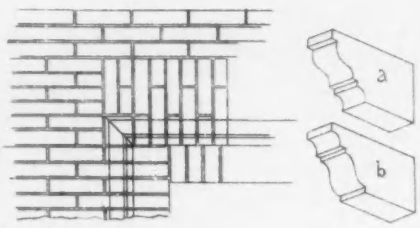
Another point which needs attention is the bond of the brick. The vicious practice, so common in this country, of using a face brick entirely different from the body of the wall, with either no bond or a necessarily slight, concealed one, is utterly to be condemned. In the first place, it is bad construction; the facing adds little or nothing to the strength of the wall, as is often very evident in conflagrations. In the second place, it fails to satisfy the trained eye; even if the bond were sufficient, the impression to the eye that there is no bond, that the wall has a thin facing in no way bound to it, is most disagreeable. In the third place, it does not make so pleasant-looking a wall as either the English, Flemish, or what might be called the American bond. It is too monotonous and mechanical and too lacking in character. Of the three bonds we have mentioned, the English and Flemish are as a rule much better constructionally than what we have called the American (we believe its use is confined to this country), *i. e.*, a bond consisting of a course of headers every four to eight courses. The latter is, however, a sufficiently good bond for all practical purposes, it may indeed be even constructionally better, where more longitudinal than transverse strength is required in the wall, and sometimes has a special value in design on account of the slightly marked horizontal lines produced by the continuous courses of headers, which, when the design seems to require it, can be emphasized by using headers of a slightly different color, either a brick of different clay or hard-burned brick. The English and Flemish bonds are, however, usually, much more effective, and make a much more picturesque wall, and each of them lends itself to its own peculiar class of diaper patterns of considerable variety, from the simple use of vitrified dark headers in Flemish bond, which is so effective in many of the "old colonial" buildings in and about Philadelphia, to the larger and more complicated patterns found in old English, Dutch, and French brick buildings; as, for instance, the diaper in English bond on the Louis XII. front of the château de Blois. The brick used in the diaper should not form too strong a contrast, or the result will be staring and unquiet. As a rule, the slightest contrast, that will tell, is the most pleasant, and it is often well to break the diaper irregularly to avoid too mechanical an effect, as is done in some of the buildings of the Inns of Court in London. Unfortunately, as already mentioned, the choice of colors in brick to be used together in this way is restricted to those which chance to bond together, and the designer is often obliged to content himself with what he can, rather than with what he would. It will be greatly to the advantage of brick manufacturers, as well as of architects, when a uniform standard size, or series of sizes, shall come into more general use. The contemptible sham of a false bond is sometimes resorted to on account, partly of this irregularity of brick sizes, and partly owing to the habit that has been formed by bricklayers using almost exclusively what we have called the American bond. So ingrain is this habit of the bricklayers that it costs more to use English or Flemish bond, though the additional cost is merely due to the fact that the bricklayers are unaccustomed to it. The more architects insist on the use of these bonds, the less expensive will they become. But at present so pernicious is the habit of our bricklayers that most of them will go to the trouble of cutting off the tails of their headers and make a sham bond, rather than lay their brick with a regular Flemish bond.

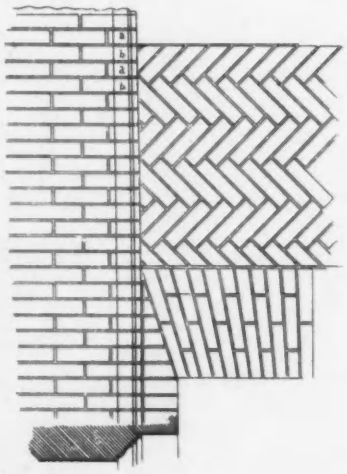
Probably the most striking visual quality of a common brick wall is its color. It is red: a very patent fact, which, however, is often not enough considered in relation to the design. In the deep red brickwork, mouldings of too slight projection, or too delicate contour lose their effect. If we desire our wall to be beautiful as well as red, we must remember that a perfectly even shade of very strong color over a large space is always especially unpleasant. Perfectly even shades are never found in nature, and are always to be avoided in art, but especially so with strong colors over large spaces. Now, an unvaried, stupid, tiresome red is not natural to a brick wall. It is natural to a brick wall to have the most delightful variety of color. The stupidity and tiresomeness can only be obtained by deliberately culling and arranging the brick until the effect is as mechanical and as ugly as if the side of the house had been painted, and it is worse than a painted wall, as the wearisome monotony has been painstakingly sought. It looks "neat" perhaps, but it is a trivial and detestable neatness, obtained at the expense of beauty. Brick should only be culled to throw out those of poor quality. It is strange that in nature we admire the wonderful variety of color in a shingle beach, and yet in building choose the dead monotony of a culled pressed-brick wall; that we go to Europe and admire the picturesque beauty of the many-tinted red-tile roofs, and yet in roofing our own buildings prefer to make them look as if they had been painted from a pot of vermilion. As a rule, common brick produce a more beautiful wall than pressed brick, on account of the greater variety of color and their superior texture. The pressed brick are generally best confined to the moulded work and arches, or used in bands in friezes or base course. In city buildings pressed brick can be appropriately used even for a whole building, if the brick are not culled to produce an even color, and they are especially valuable in interior work. But in buildings in the country, set among trees and rising from greensward, the common brick, on all artistic considerations, are greatly to be preferred, and the great variety of color that can be had by combinations of common brick of different makes (provided they will bond with one another) can be made productive of the most charming color harmonies.

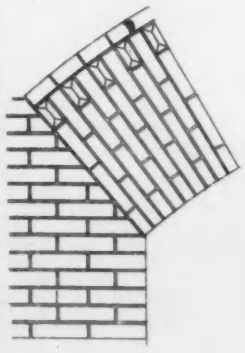
To speak of the use of tile and glazes, and of terra-cotta, which must play an important part in any complete brick architecture, is rather beyond the province of this paper. It may be worth while, however, to note that the use of tile of various shapes and colors in connection with brick can be made greatly to enrich our brick

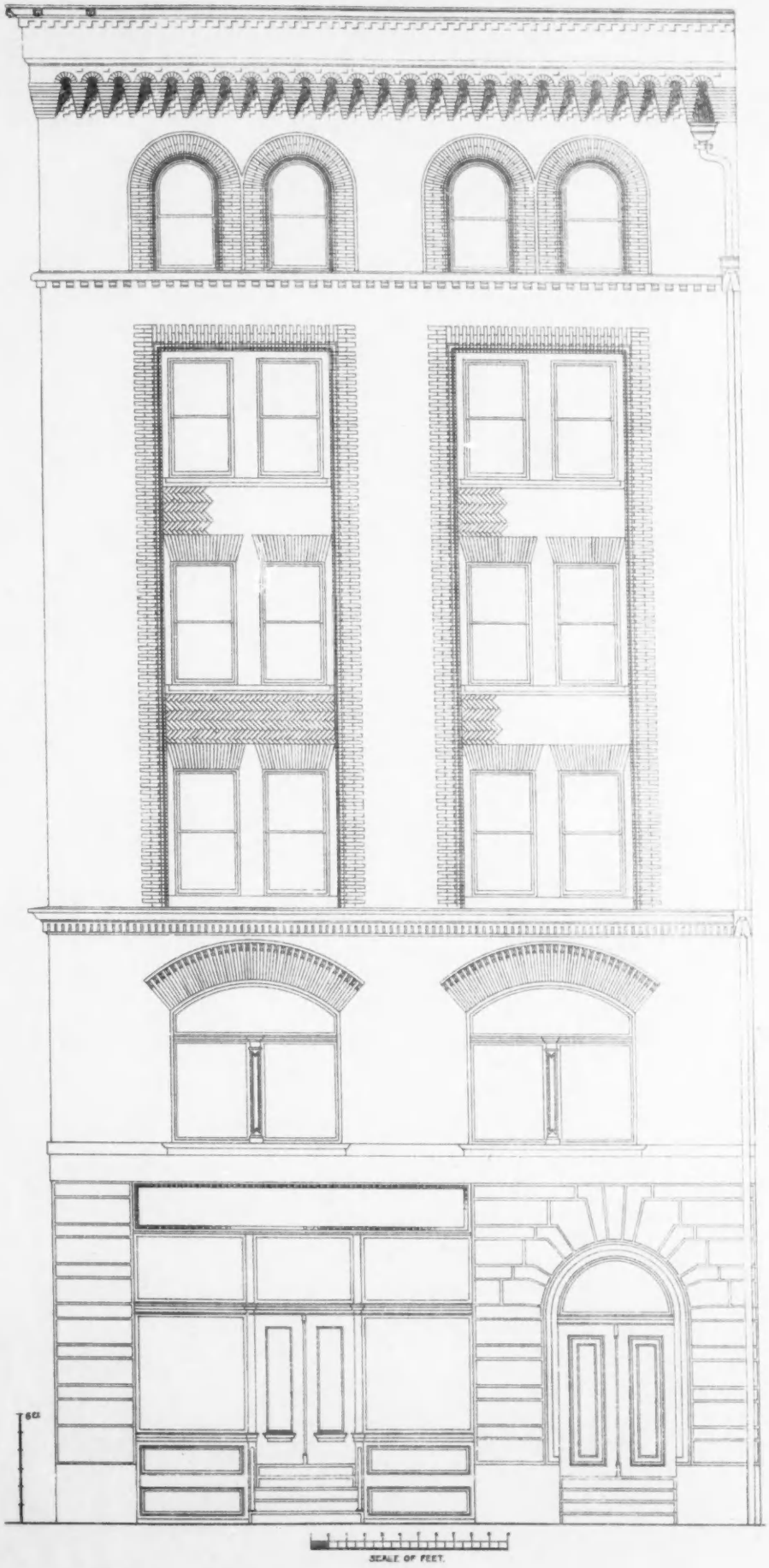


BRICKS MARKED "S" ARE SUNK









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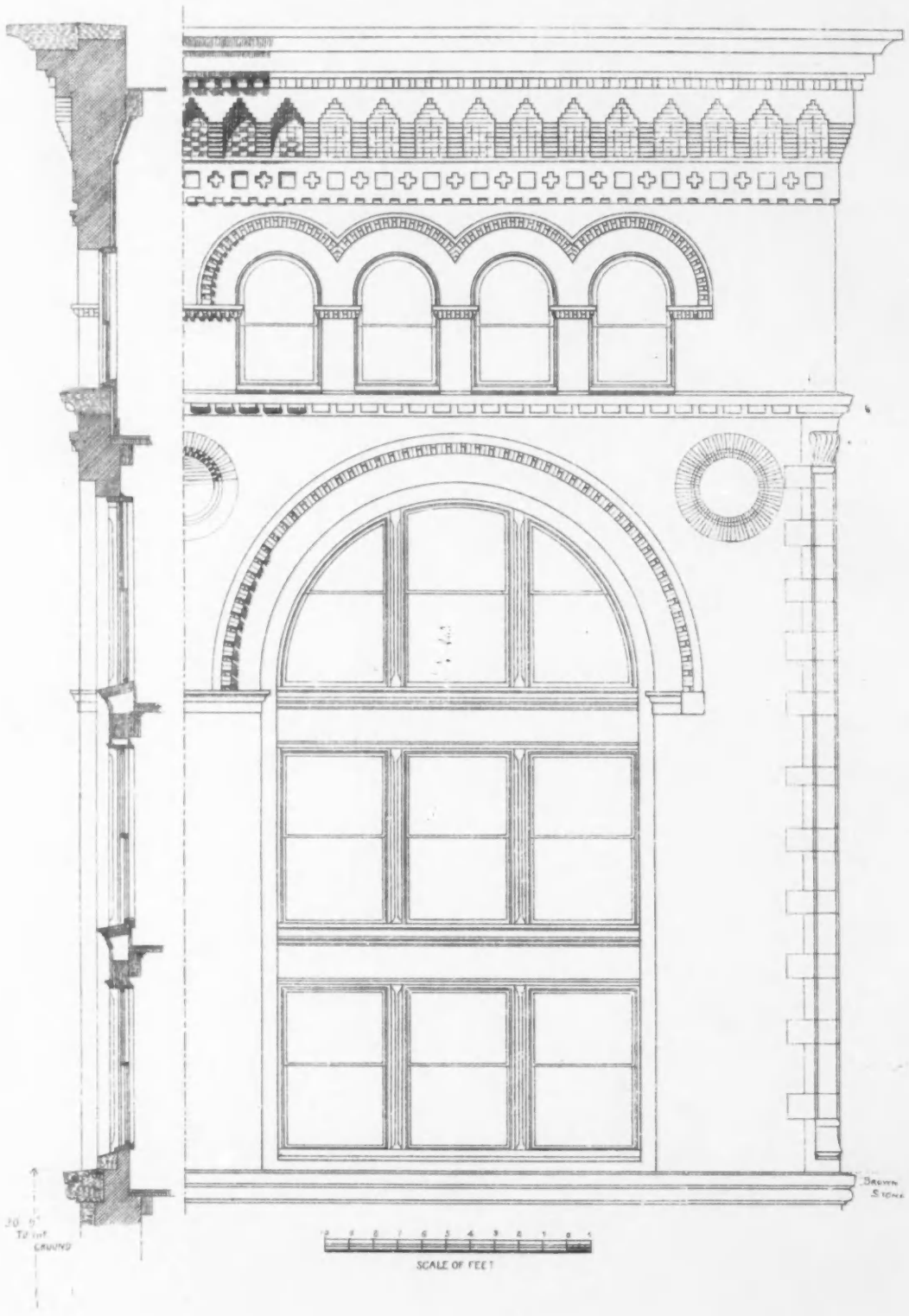
BUILDING FOR THE LUDLOW MFG. CO., BOSTON.

MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON.



DRAWN FOR THE BRICKBUILDER FROM THE ARCHITECTS' THREE QUARTER SCALE ELEVATION.

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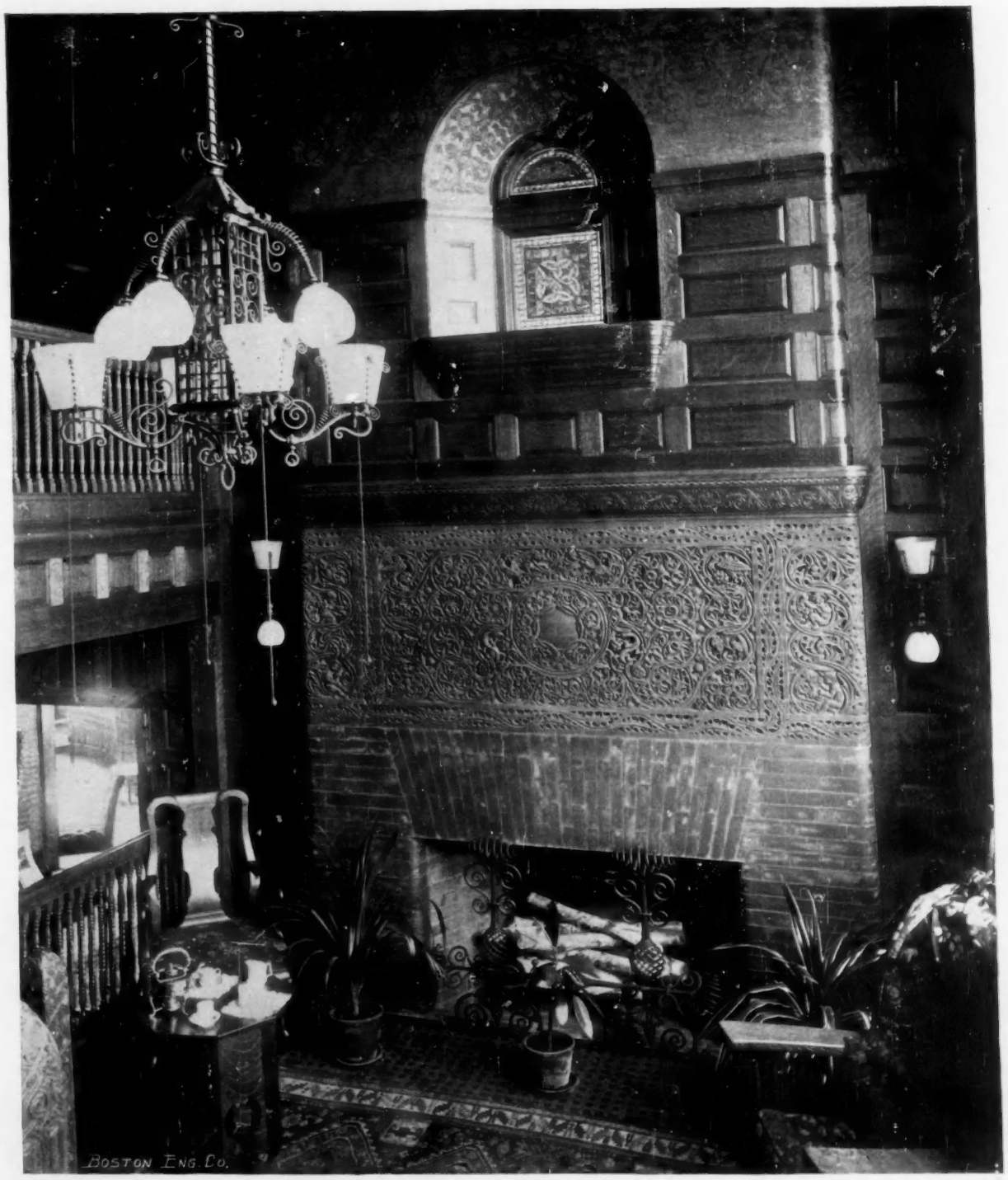
CORNER BAY OF THE LINCOLN STREET STORES, BOSTON.

FREDERICK L. AMES, ESQ., OWNER.

MESSRS. SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, BOSTON.



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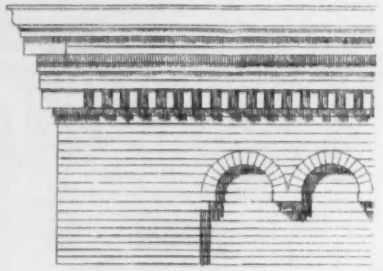
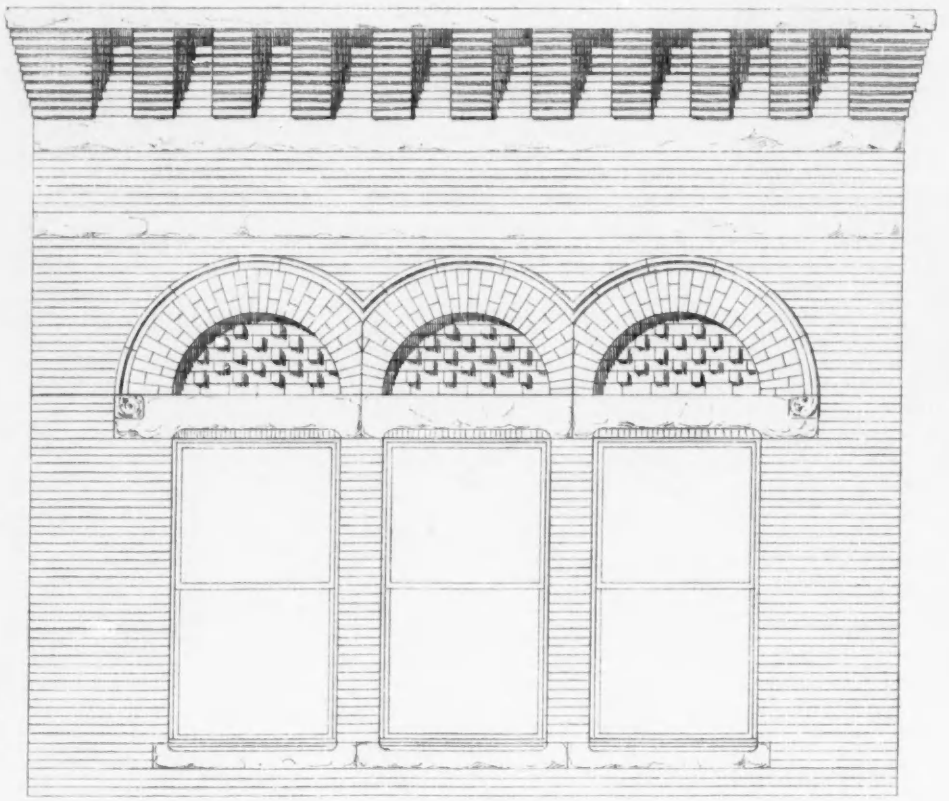
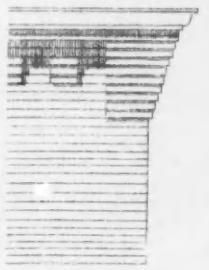
CARVED BRICK MANTEL IN RESIDENCE OF HENRY D. YERXA, ESQ., CAMBRIDGE, MASS.
Messrs. Hartwell & Richardson, Architects, 60 Devonshire St., Boston, Mass.



CORNICE · PHILIPS SCHOOL ·
· BOSTON ·

· SECTION ·
· PHILIPS SCHOOL ·
· CORNICE ·

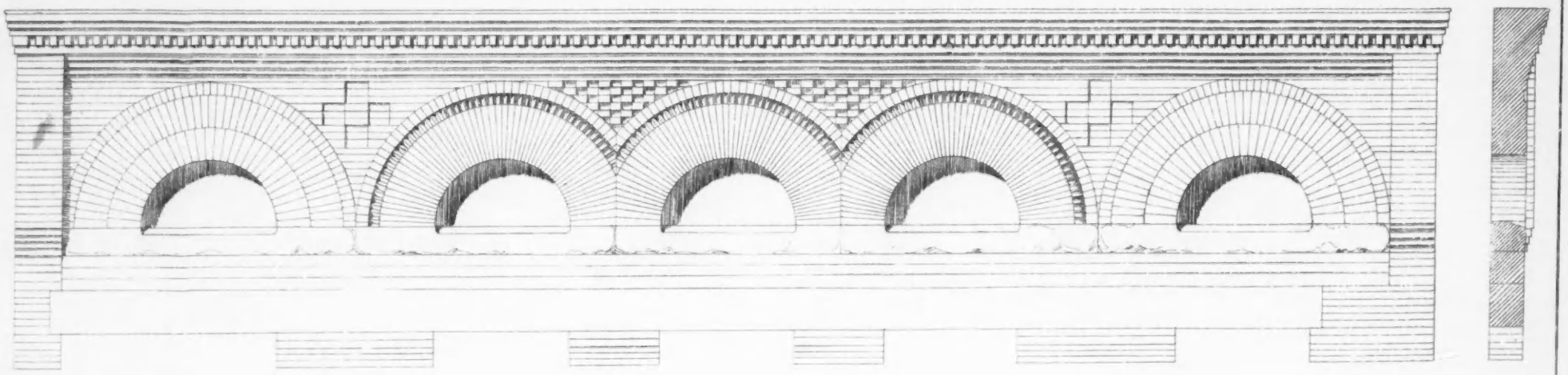




· TOWER CORNICE · ST ANDREWS HOUSE ·
· BOSTON ·

· THREE ARCHES AND CORNICE ·
· PATROL HOUSE · JOY ST ·
· BOSTON ·

· FIVE ARCHES AND CORNICE ·
· COLD STORAGE WAREHOUSE ··
· BOSTON ·



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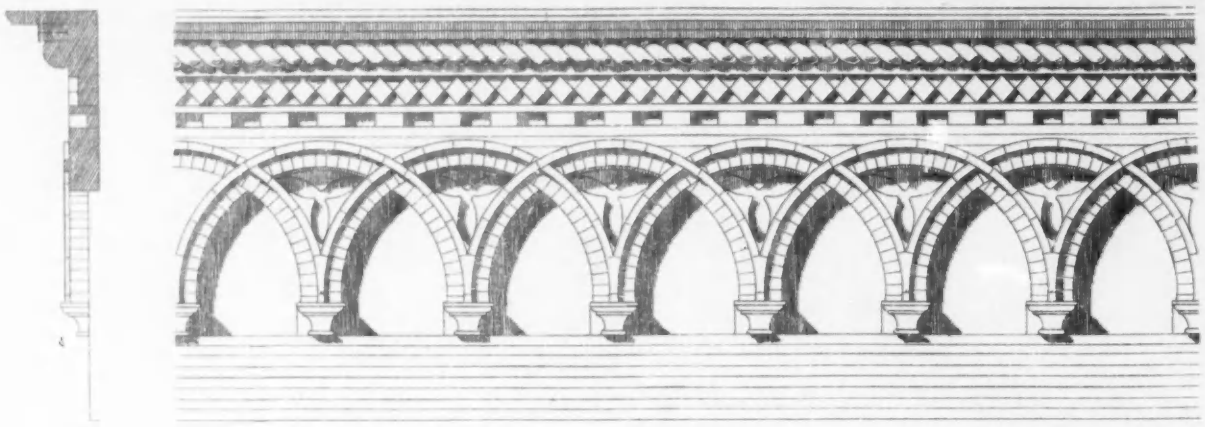
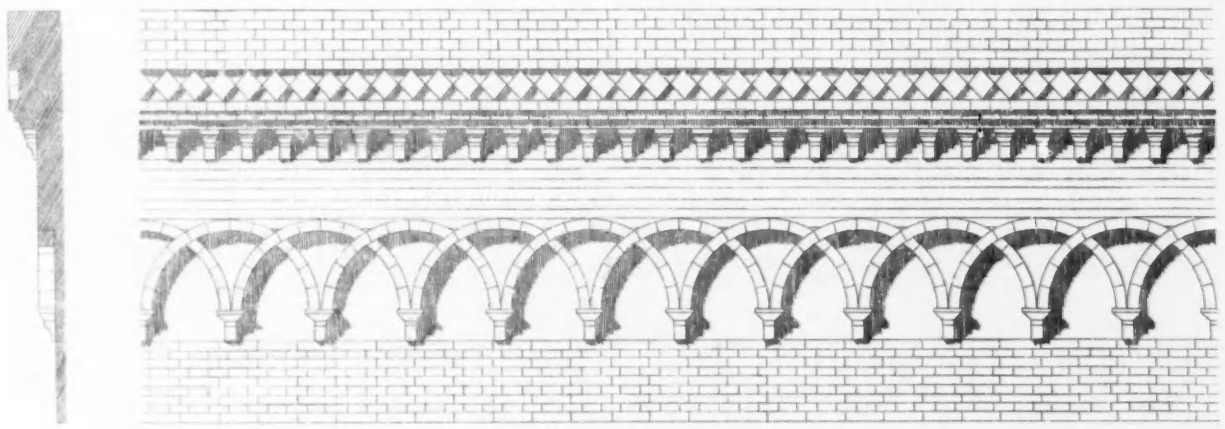
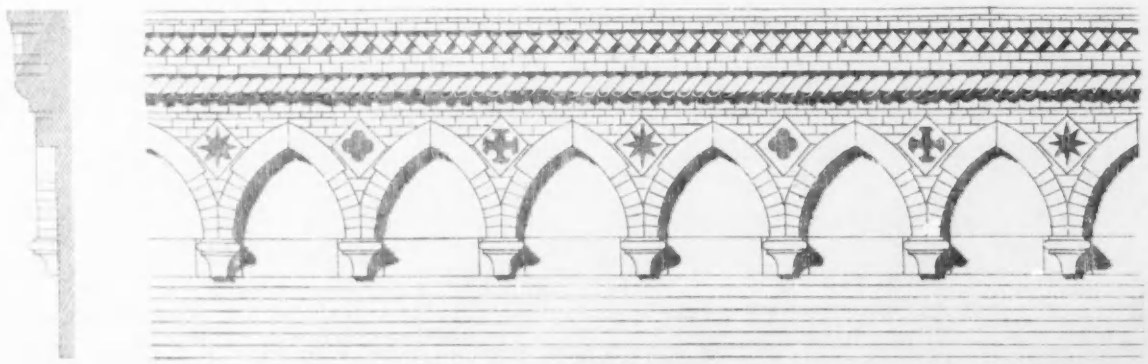


CORNICE
S. GIOVANNI E PAOLO
VENICE



CORNICE
SANTA MARIA IN FORO
VICENZA



CORNICE
SANTA MARIA AI FRARI
VENICE

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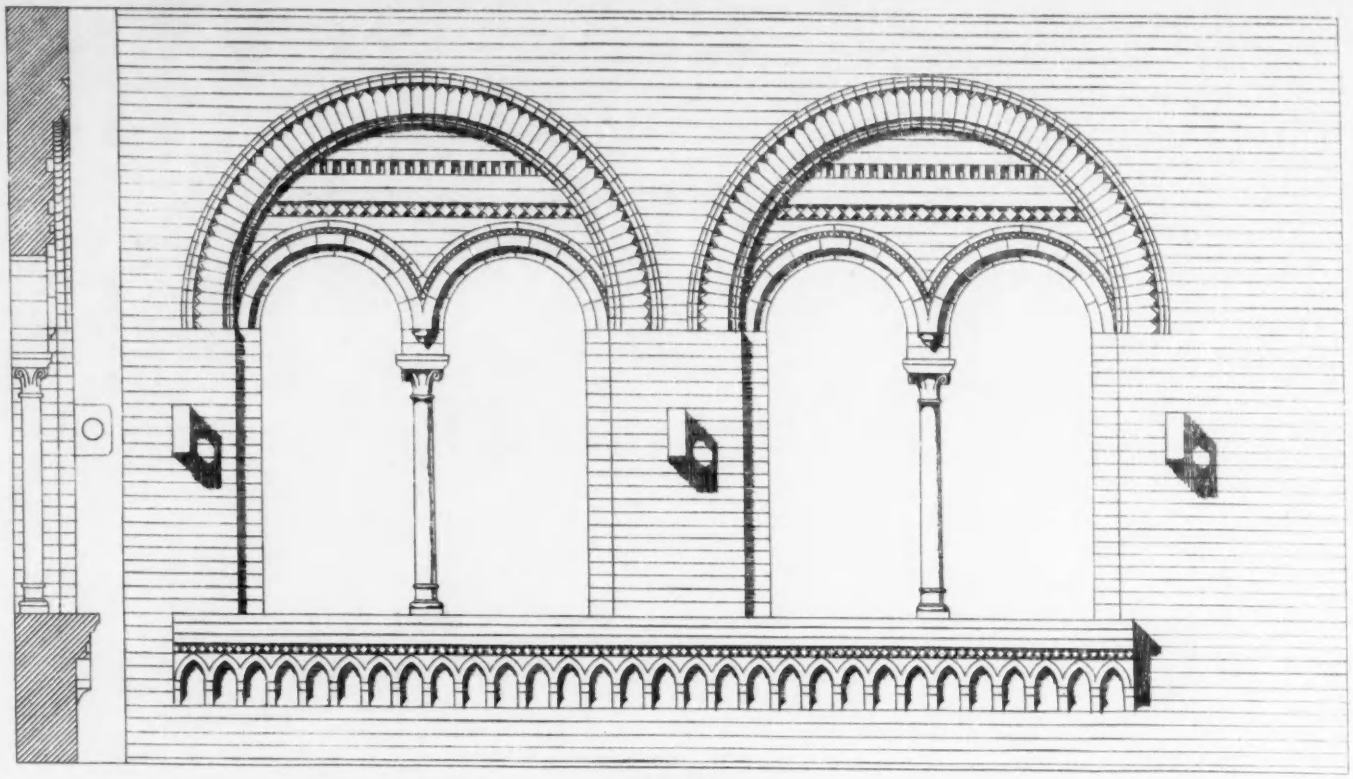
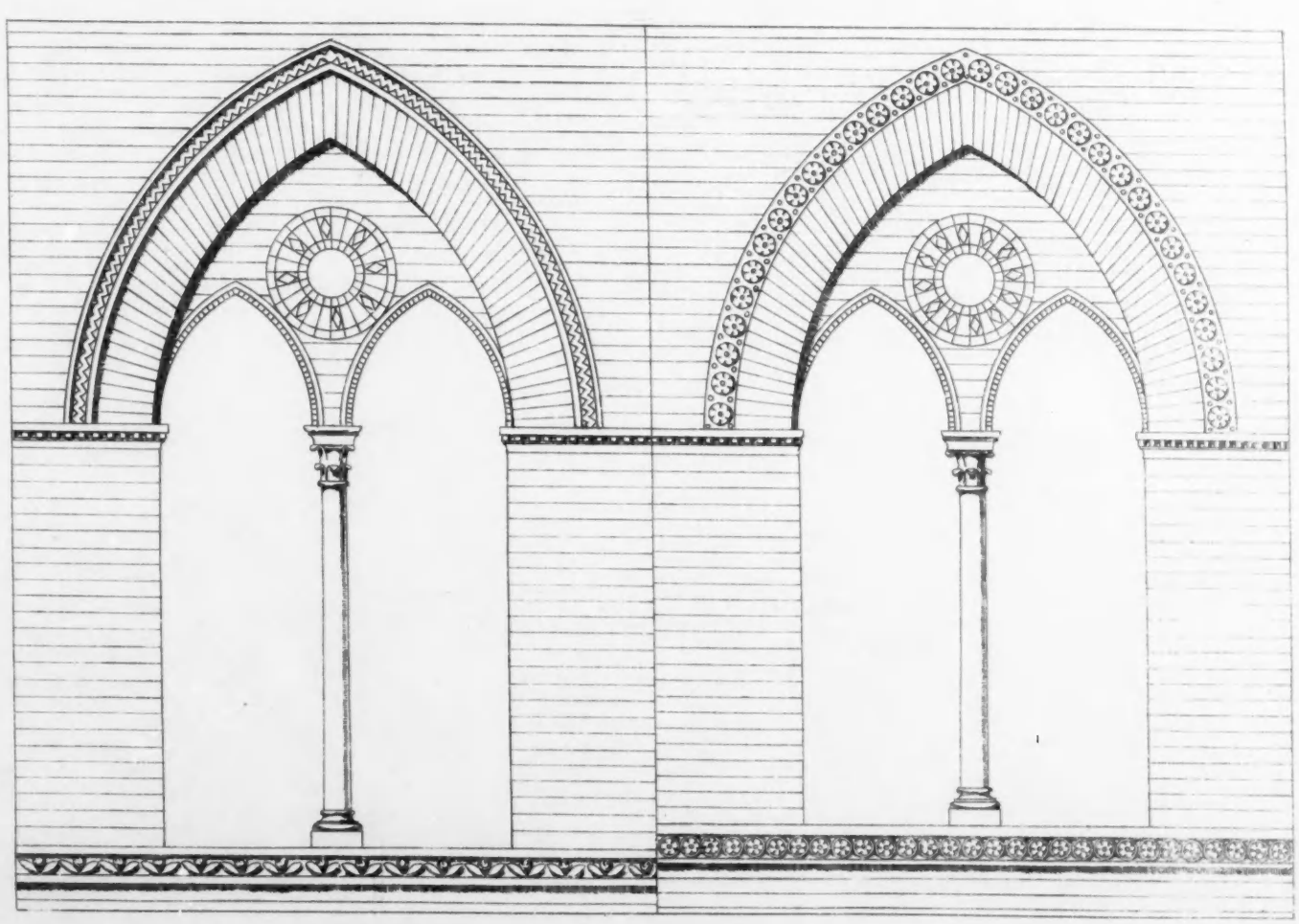
SOME ITALIAN CORNICES.



◦PADVA◦
◦CASA D'EZZELINO◦



◦SAN◦GIMIGNANO◦
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SOME ITALIAN WINDOWS.

House for Dr. W. B. Parker: Marlboro St. Boston.

Messrs H. W. Hartwell and W. C. Richardson · Architects ·

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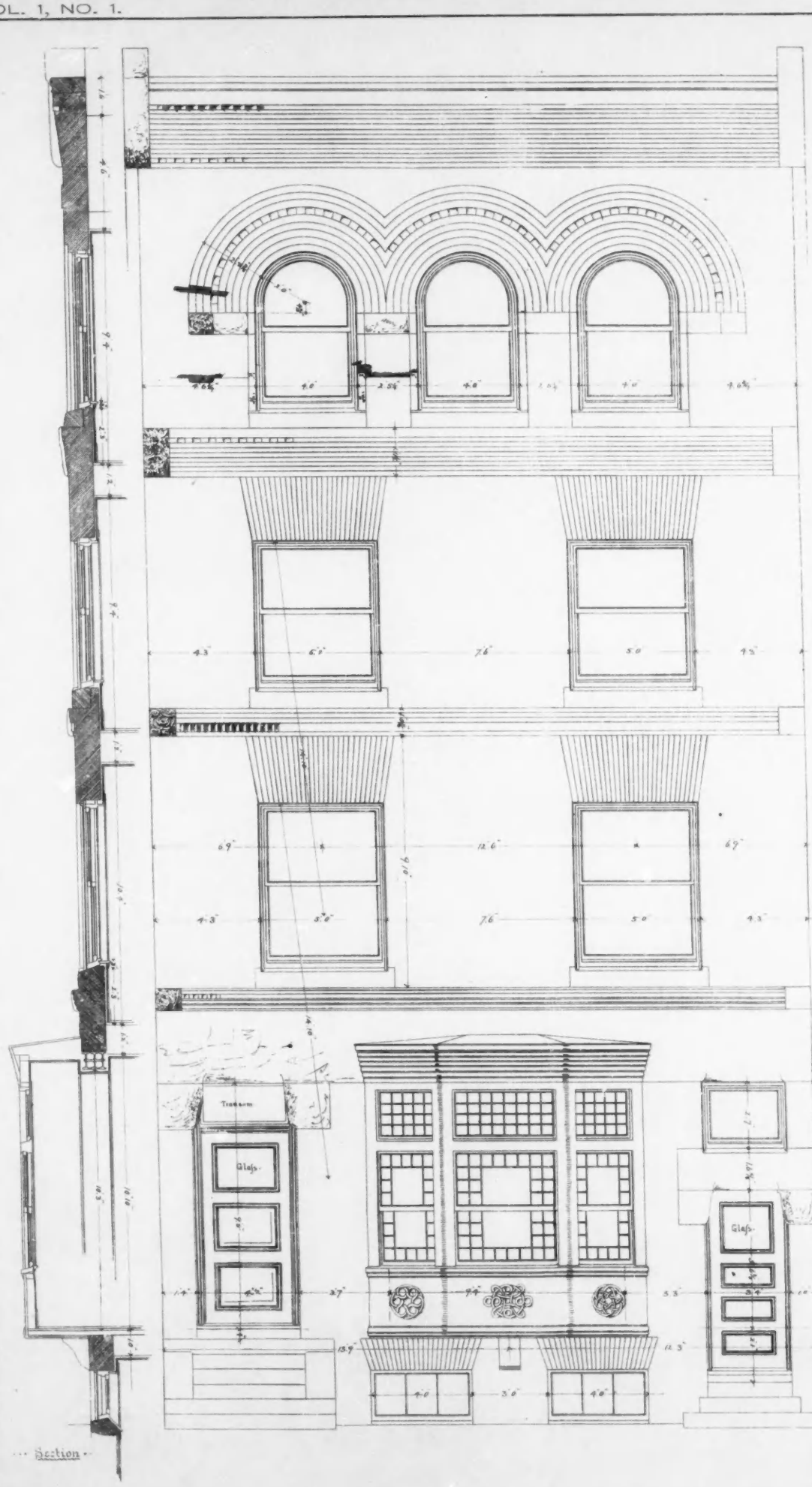
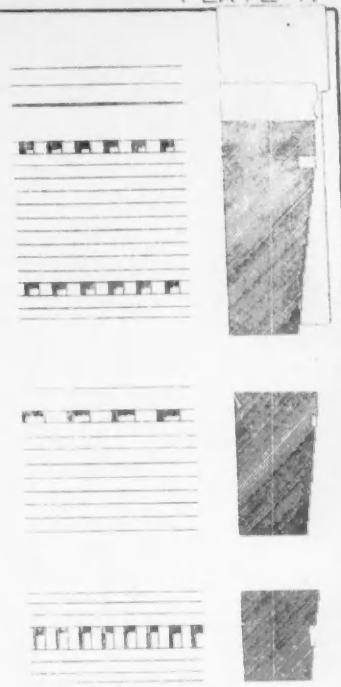
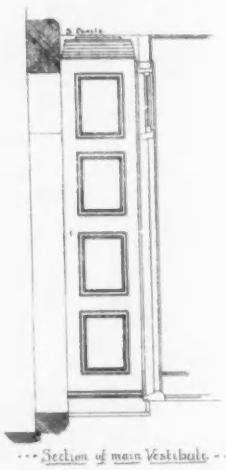
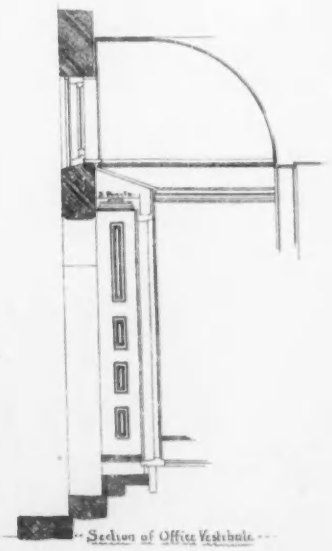
PERSPECTIVE SKETCH, RESIDENCE OF DR. W. B. PARKER, BOSTON.

MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON.









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ELEVATION OF RESIDENCE OF DR. W. B. PARKER, BOSTON.

MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON.

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GABLE OF RESIDENCE OF COL. J. C. HAY, WASHINGTON, D.C.

THE LATE H. H. RICHARDSON, ARCHITECT.

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architecture, and will doubtless in the near future lead to new and promising developments. One simple use of roofing tile very common in Auvergne may be mentioned for its effectiveness and its suggestion of further possibilities. The simple pan tile is there used to form the corbelling of the cornices of many of the dwellings. The tiles are imbedded in the wall at one end and project about one fourth of their length. They are laid close together, all with their concave side up. Three or four courses in height, breaking joint with each other, each course projecting beyond the course below, are used to form the corbelling of the cornices. The ends of the tile are filled with cement. The effect is extremely pretty.

It has been the object of this paper, merely to call attention to a few considerations with regard to brick architecture, which, though trite, are often neglected, in the belief that merely to direct attention to them will lead to their being more often regarded. In developing our own brick architecture we cannot do better than turn to the noble brick building of the past, in the endeavor to learn the principles that underlay its developments, and in the hope and belief that these principles will receive more beautiful exposition in the future.

H. Langford Warren.

A TERRA-COTTA STYLE.

The larger employment of terra-cotta as an architectural dressing promises to do something towards the development of a bolder style of street frontage than we have been in the habit of seeing. A few of the advantages of employing this material we have lately referred to in these pages, such as its durability compared with stone, and even with brick, in a smoke-charged atmosphere; but there is one other recommendation which it has over brick that may be mentioned, namely, its determination of feature. The architecture of every great period has been determined, in a very large degree, by the materials employed; thus we had the monolithic style of Egypt and Greece, in which large masses of stone or marble of great hardness were used in huge rectangular blocks, and we had the composite construction of the Romans giving expression to a more tractable and pliant style of building, in which bricks and smaller stone masonry were combined. The Romanesque and Gothic builders still further developed the composite method by adopting the arch and vault, and showed what noble and grand effects could be achieved by the use of small stones and rubble constructed upon a strictly mechanical system. Every component stone or brick was placed, or rather supported, by compressive action, enabling the builder, so long as he could use massive walls and buttresses, to build vaults unknown to the ancients. Architecture, like history, has repeated itself, and we are now in an age of transition adopting both methods. There is reason for believing, indeed, the monolithic principle is about to reassert once more a sway over the architect. The processes of manufacturing concretes out of broken material and *débris* has led to the production of large monoliths in construction, and burners of terra-cotta have discovered the secret of moulding masses of clay, without appreciable shrinkage or warping, that can take the place of stone. The re-employment of these materials, cast in large forms, will take us back to the trabeate system of the Greeks. But let us act upon principle, and not too hastily.

With brick, the architect had to combine to produce effect. Let us take the Gothic epoch of German brick-building, when the most elaborate structures were built of brick. In the earlier period the brick Romanesque prevailed in the North German lowlands, and a rich style of pier growth was the result, that has never been surpassed. The shafts of brick were grouped together or clustered, the upper part of the shafts being often brought to a square under the abaci, which retained the rectangular forms in plan. The towers, often connected, are well known to students of Rhenish architecture. In the later and Gothic epoch brick features reached their complete development; the piers were made less numerous, but became more elaborate in plan, for we occasionally see squares with membered shafts of half-cylindrical shape on each face, or octagon forms richly shafted and undercut between the salient angles; yet, with all these modifications, the simple outlines were observed, for it is a peculiarity of brick growth that though the parts are multiplied, the contours are preserved simple from the very exigencies of the material. In stone, in large masses, there was scope for the architectural enrichment by deep mouldings, and consequently we find the Gothic arch members often assumed very irregular forms in section. In brick architecture the contrary followed as a matter of course. We observe this in the deep splayed jambs and heads of doorways, where the receding face is broken up into squares or rectangular notches, or enlivened by shafts and members as in a rich moulding. A considerable richness of membering was thus produced, though, as one writer says, owing to the limits imposed by the material, a "strict architectonic law was observed in a certain rhythmic repetition of the design."

Now, what was the cause of the decline of this architecture? We find it was the general return to stone treatment. Hitherto the moulded work and ornamentation were restricted to the legitimate principle of brickwork or repetition of the same general form; but now architects began to copy stone design, the mouldings and tracery of stone, and from that time the brick architecture declined. We instance the history of German brick-building to show what has happened, and will happen again, if we mistake the employment of brick or terra-cotta for stone. Architects have been hitherto content to reproduce "literally" stone features such as windows, cornices, pilasters, and other ornaments in the material, without making allowances for the nature and properties of moulded and baked clay. As we find in the study of brick architecture, while it flourished both in Germany and Italy, the essential idea of brickwork was preserved, and a special treatment was followed depending upon the physical peculiarities of the material. It never imitated stone ornamentation; when it did, the style soon degenerated. We have few modern buildings in London where terra-cotta has been used with satisfactory artistic results. It is generally made a substitute for stone, and some architects design in so accommodating a manner that we constantly see in descriptions of designs sent in in competition, that the dressings or features may be executed in "either stone or terra-cotta." What can be expected from such an illogical process of going to work? If a façade has been designed for stonework, it is ten chances to one ill-adapted for a proper terra-cotta treatment. Large masses of the material cast in pilasters, mullions, jambs, and the like, and jointed with brickwork, are employed, which either crack by unequal settlement of the two materials, or by improper or close jointing of the terra-cotta, or are so warped in the lines as to destroy all sharpness of effect and accuracy in the work. In many recent city buildings in Fleet Street, the Strand, and the Poultry there are instances of misapplication arising chiefly from a desire to imitate stone features in the bulk. Thus we see whole windows with their ordinances cast in a few pieces of terra-cotta, arches constructed of blocks of large size, reproducing the details of stonework. By using smaller blocks — a certain multiple of the brick courses — and by preserving in the design a treatment dictated by the importance of avoiding inequalities of mass or undercut members, there is much to be done to render terra-cotta a pleasing and useful substitute of stone in brick buildings. The brickwork of Germany affords in many of its details very admirable forms, as those of jambs and piers, stringcourses, water-tables, cornices, and other features of a decorative character. No better models for moulded work can be seen than in many of the brick churches of that country. A larger and bolder manner of building or ornamentation must of necessity arise if architects follow the principle we have suggested. As the difficulties in the way of firing, etc., are overcome, so will the material be made into large blocks. The limits of the ornamentation are, however, set, and the forms which can be most easily moulded must stamp the architecture that is evolved from such material. For warehouse purposes, and street architecture generally, we have experience to work upon. In Farringdon Street, near Holborn Viaduct, a large warehouse for Marcus Ward & Co. is erected, in which a nice cream light red-toned terra-cotta has been introduced in the red brickwork, blending well with the latter. The style is a free Renaissance, a large, wide, and somewhat awkwardly proportioned gable occupying a considerable portion of the front, with one low wing. The centre of the gable has a bay window entirely of the material, and the large two and three light windows with mullions and ornamental heads indicate the value of terra-cotta for window openings of a large flat kind. A deep cornice, with flat modelled trusses of slight projection and relief ornament between, runs along the front, and from this the raking cornice and coping, also of terra-cotta, springs. Here the projections are kept flat. We could point to other recent examples of the use of the material; in the mean time the value of relief of a light kind, for red brickwork especially, and a tint that will harmonize with the red work and keep clean, are obvious advantages, not to be slightly passed over. — *The Building News.*

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SPECIAL DESIGNS FOR THE BRICKBUILDER.

A MODEL CHURCH.

THE BRICKBUILDER has commissioned a prominent architect of Boston to prepare a careful and complete set of plans, elevations, and details of a church to be built entirely of brick. It is intended that this design shall be ideal in that it is the solution of a general rather than a special problem. It will, therefore, contain many features, some of which would be omitted under certain conditions of actual execution, some under other conditions, but any one of them left out of the solution of the general problem would leave that solution incomplete. Therefore, that it may embody all requirements, even of a ritual service, it will be an Anglican or a Catholic church, but all details of construction and of decorative brickwork will be studied upon so broad a basis that they will apply equally well, so far as principles are concerned, to any other church edifice. The designer chosen for this problem has made a careful and exhaustive study of brick architecture in the different countries of Europe, and especially in the Netherlands where the natural building material is clay, where a true "brick style" is found, and whence comes the inspiration of much of the best American work.

The drawings for this church, giving plans, elevations, sections, and details, exterior and interior, will be published in an early number of the paper, and will be accompanied by a complete explanation.

The church is the first of a series of problems which will be given to architects of the highest ability, and we hope to get general types of different classes of buildings, which shall serve as models for study by those who do not understand the fundamental principles of brick design. This series must not be confused with the competitive designs announced below, for they are entirely different. Both classes, however, are instituted in an effort to find out what can be done — they form that portion of the plate matter that is devoted to the future.

THE BRICKBUILDER COMPETITIONS.

To encourage original design in ornamental brickwork, THE BRICKBUILDER will institute a series of carefully arranged competitions, with rewards adequate to the problems. These competitions will be open to every one upon the single condition that the programme be carefully followed. Besides the several principal prizes, which will be either money or books, or both, there will be a number of minor prizes given to all competitors whose work reaches a certain standard of excellence. Each competition will be thoroughly fair and impartial, the awards being made by a competent jury. It is only owing to lack of time to complete arrangements for the satisfactory judgment and criticism of designs, that the announcement of the first competition is deferred until our next issue.

To afford some idea of what these competitions will be, we will mention a few of the problems that will probably be submitted for solution. As one idea is to lead architects and draughtsmen to a careful study of the finer points of detail work, some problems will present a certain number of definite features with which it will be required to harmoniously combine others. For instance, a window will be given with certain fixed mouldings and ornamental features to which it is necessary to add others to complete the design. The designer is here limited to a careful study of decorative design, in which the best proportion of parts, the best distribution of decorative units, is going to win.

Again, a façade will be given, lacking one feature, say the cornice. The various patterns of bricks at command will be given and the designer will be required to complete the façade by the addition of the cornice, which must be in proportion to the rest of the building and of the same character.

To suggest improvements in the design of ornamental bricks, some problems will be given in which it will be necessary to devise patterns which will meet certain general requirements, artistic and constructive, among the latter of which will be economy of manufacture, perfect bonding, adaptability to interior and exterior angles, returns, etc.

Occasionally larger problems with proportionate rewards will be given, and these will call for designs of complete buildings, the programme being drawn up with a view to representing a *type* of problem, the solution of which will lead to general rather than to specia study. The winning designs will be published in THE BRICKBUILDER, and if there are others of real merit, arrangements for their publication may subsequently be made.

The programme of the first competition, with full conditions, will be announced in the February number.

WETTING BRICKS BEFORE USE.

New bricks are always covered with a coating of dust and fine sand, and, unless this coating is washed of, it intervenes between the bricks and mortar, and frequently entirely destroys the adhesion. Strong brickwork cannot, therefore, be executed either in lime or cement mortar unless the bricks are not only damp but have actually been washed. Colonel Totten, of the United States army, remarks on the subject of experiments against casement embrasures: "In the later firings against brickwork from a 42-pounder, it was noticed that there was a separation of bricks from mortar very generally, as the limit to the breach caused by the shot; and it was certain that if the cohesion had been greater the effect of the shot would have been materially less." "The want of cohesion was due, as seemed to me, beyond any doubt, to the interposition of dust, sometimes quite free, but, perhaps, more generally composing a layer slightly cohering to the body of the bricks. The process of laying must be to cause every brick to be thoroughly soaked in water, and to be laid the moment it ceases to drip." In an experiment made at Shoeburyness with shot and shell fired from an 80-pounder Armstrong gun against an experimental brick revetment before the Defence Commission, not only were the bricks blown out without a particle of mortar adhering to them, and generally without a fracture on them, but about three feet from the ground, the whole of the under part of the revetment was blown away for a length of twelve or thirteen feet, and to a depth of five or six feet, leaving an entire horizontal course of bricks at the upper limit of the fracture, with an even course of cement adhering to it, precisely as if it had been laid on as stucco after the lower part of the wall had been removed. To have allowed of such a clean separation, leaving a horizontal beam of bricks with so long a bearing standing, and evenly coated with mortar underneath, some unusual interference with the adhesion of the mortar must have been at work. As the wall was built on a site of which the soil consisted of fine sand, it seems probable that the line of separation marked the termination of one period of the work, and that before the next was commenced a layer of fine sand had been deposited on it by the wind. Colonel Totten thinks that his orders with respect to wetting the bricks could be carried out, without extra expense, by an "arrangement easily devised," but Vicat states "the soaking of materials is evidently an addition to the labor which should be taken into account in the detailed estimates," and doubtless, though the extra expense of water when abundant need be trifling only, there must be some allowance made for it beyond what is now paid for brickwork. It is certainly, however, well worth consideration whether, if the difficulties in the way of carrying it out were greater, they ought not to be surmounted, more especially in extensive fortifications constructed with bricks burned on the spot, and built into the work as soon as they have left the clamp or the kiln, — often, indeed, before they are cold. What difficulties there may be in effecting it are not so much raised by the master builder — for a trifling extra price to cover the expense of the wetting would satisfy him — as by the bricklayer, whose day's labor is considered of the same value, whether he works with wetted or dry bricks, and bricks "just ceasing to drip" are so hurtful to his fingers that he has a decided objection to handling them in that condition. Colonel Totten, indeed, in continuation of his former remarks, adds, "but I must caution you that, as this will be in some respects a disagreeable process to the masons, they will neglect it or do it improperly, unless it

be imperatively and perseveringly insisted on." The best plan, therefore, would be to wet the bricks for them by trustworthy workmen, employed and paid by Government. Probably a soldier, who has been accustomed to obey orders to the letter, could best be depended upon in such a case. Vicat recommends in large works watering the bricks whilst in the stack with a fire engine, so that they may reach the mason's hands in a soaked state. It was thus, he states, that M. Inspector-General Deschamps, at the bridge of Bordeaux, watered the bricks piled upon the service bridges. — H. D. Y. Scott, in *The Architect*.

THE ILLUSTRATIONS.

Plate I. Building for the Ludlow Mfg. Co., Boston. Messrs. Peabody & Stearns Architects, 53 Exchange Street, Boston.

The basement story and the sills and strings of this building are of brownstone; the rest is entirely of brick. It is a capital example of the beauty that can be attained by a simple and right use of ordinary brick forms. It is noticeable that the effect is obtained, with only a sparing use of moulded brick. The few moulded brick used are from the Philadelphia and Boston Face Brick Co.

The building is charmingly proportioned, and the detail well studied and good in scale. The cornice is a good example of design suited to the material. It has great height and shallow projections.

Plate 2. Corner Bay of the Lincoln Street Stores, Boston, Fred. L. Ames, Esq., Owner. Shepley, Rutan & Coolidge, Architects, Ames Building, Boston.

Our illustration shows the upper part of one bay of this store. The story below is of brownstone, as are also the strings and the crowning member of the cornice, and the angle column. The building is an admirable and well-proportioned example of the effective use of common, unmoulded brick. The only moulded brick is in the dentils. The cornice is especially successful, and is an example of the peculiar attractiveness that can be given to a well-treated brick cornice having qualities such as could not be obtained in any other material. We venture, however, to question whether the use of brownstone for the lower story, in connection with brick above, is ever desirable. Each material seems to lose by juxtaposition with the other, and we think this building would have gained in dignity and attractiveness had it been entirely of brick. The brick used in this building are sand-struck bricks from the kilns of the Granite State Brick Company, at Epping, N. H.

Plate 3. Some Boston Details.

These are characteristic, but by no means faultless details, quite representative of the average of modern brick architecture.

The upper part of the cornice of the Phillips school is liney and confused, and has rather too much projection for the treatment adopted. It would be improved by suppressing some of the offsets. The cornice of the Patrol House on Joy Street is rather bald in effect, and the very long brackets seem hardly required to carry the slight, but rude and shapeless, crowning member of stone. The arches are an example of the way not to combine stone and brick. The combination of arch and lintel is unpleasant in itself, and one feels that either the arch or the lintel is superfluous. The five arches of the Cold Storage Warehouse are better; but here, too, the cornice is unpleasantly liney. It would be improved by suppressing one of the offsets. The diaper formed of alternately projecting and recessed headers is effective. Where such projection is used to form diapers or other decoration in brickwork, it will be found that a very slight projection generally produces the best result.

Plate 4. Some Italian Cornices.

The cornices here given are from the churches of San Giovanni e Paolo and Santa Maria Gloriosa dei Frari a Venice, and Santa Maria in Foro at Vicenza, all of about the middle of the thirteenth century, and are characteristic and admirable examples of Italian Gothic brickwork. The great height and very slight projection of these cornices are especially noteworthy, as well as the simple means by which so much and so beautiful effect is produced.

Plate 5. Some Italian Windows.

These examples of Italian Gothic windows from the house of Ezzelino at Padua, and from a house in the Piazza Cavour at San Gimignano, are of about the same period as the examples of cornices given. Here again the flat projections, the surface decoration, and the smallness of the parts are to be noticed, and the curious method of alignment of the arch brick, the joints of which are struck from one centre as for a semicircular arch.

Plates 6 and 7. Residence of Dr. W. B. Parker, Marlborough Street, Boston. Messrs. Hartwell & Richardson, Architects, 60 Devonshire Street, Boston.

This is another example of effect obtained by the simplest means. There is here absolutely no moulded brick. The detail of strings, cornices, and arches consists entirely of slight offsets in the brick courses, and the use of simple dentils of projecting headers used flatwise or vertically. The design seems to us rather too heavy in effect for a private house, due especially to the exaggerated depth of the flat arches and archivolts, though this heaviness is partly redeemed by the very slight projection of all the members, and the stories are too nearly equal in height for the best proportion. In this respect we cannot help thinking that the design would have been greatly improved by the omission of the string at the level of the third-story window sills. The design is at any rate to be commended for its straightforward simplicity. The brick used in this building are Hoyt's water-struck bricks, made at Haverhill. The first story is of brownstone.

Plate 8. Gable of Residence of Col. J. C. Hay, Washington, D. C. The late H. H. Richardson, Architect. Published by permission of Messrs. Shepley, Rutan & Coolidge, Boston.

This gable is a suggestive instance of the use of flush brick patterns. The rounding of the window jambs and inner edges of the arches is the only moulding in the gable, and this does not tell as a moulding, but merely a softening of the edge. The patterns are all flush, the label course over the windows being the only projecting brick. The pear-shaped centres of the scallop ornament are flat tiles made to shape and set flush. This decoration was doubtless suggested by the scale-like arrangement of the arches which form the inner shell in Roman brick dome construction, as at the Pantheon, or as may be seen in the exposed brick domes at Spalato. This Roman domical work was not intended to be exposed, but is very decorative in effect, and suggestive. The tipped brick in the gables are found in old Dutch work in New York State, especially about Albany.

Supplement. Fireplace in the Residence of Henry D. Yerxa, Cambridge, Mass. Messrs. Hartwell & Richardson, Architects, 60 Devonshire Street, Boston.

We think the cases are exceptional in which terra-cotta is not on all accounts to be preferred to brick carving, as the latter method of working is not germane to the material. But the treatment of the brick carving in this mantel seems to us one of those exceptions. The effects sought are such as can better be given by means of carving in brick than by the use of terra-cotta. The intricate, interlaced ornament makes use of the limitations of the method very cleverly, and the sparkling effect, the evenly distributed pattern, and the deep incisions of the darks are all more suited to carving in brick than to terra-cotta, and justify the use of the method employed. The design points very clearly to the distinction to be made between brick carving and terra-cotta. It was executed by Mr. John Evans, of Boston, and the bricks are the Philadelphia Peerless.

INTERCOMMUNICATION.

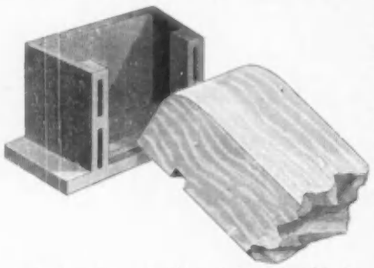
One of the aims which The Brickbuilder proposes to itself is to bring architects and brick manufacturers, as well as brick masons, into closer relationship, and as one means to this end it will open its columns to questions and answers, suggestions and criticisms on all matters related in any way to the subject matter of the journal, whether practical or æsthetic. This department will be left entirely in the hands of our readers, and its value will depend on the interest they take in it. We have no doubt, however, that such an interest will be taken in it as will insure its great usefulness. We commend the department to architects, brick manufacturers, and brick masons, and urge them to make the freest use of our columns by sending any questions, suggestions, or points of interest which occur to them in the course of their daily practice and work, and as you, reader, whoever you may be, hope to profit by others' answers, we conjure you to reply to any question that may appear here, the answer to which your special knowledge enables you to give.

PRACTICAL NOTES.

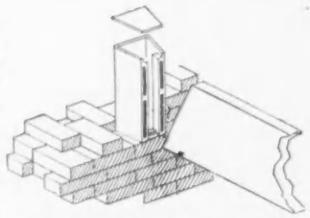
[PUBLISHERS' ANNOUNCEMENT. — Under this heading we shall mention improvements in connection with brick-building, but *in no case* will any paid for matter be allowed in these columns, for the purpose of this department is not advertising. No matter appearing here is in any way, shape, or manner published as part of any advertising contract, verbal or written. The selection is made for the practical use of our subscribers. While in many cases articles are written upon data supplied by manufacturers, we are confident that these data are trustworthy.]

WALL ANCHORS.

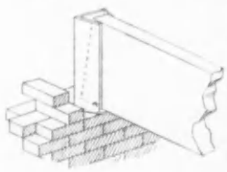
For many years the usual method of anchoring walls consisted of an iron strap with a T head welded upon the end. This strap was securely nailed to the joist, while the T end was built into the wall. This method, while being good enough and very simple, had one very bad fault, namely this: in case of fire the joists quickly burn through, and in falling they cannot free themselves from their anchorage, and the consequence is that in many instances the walls are either broken or else pulled down. No one will deny that a standing brick is the best barrier to the spread of fire, therefore such methods of anchoring joists should be adopted as will have no tendency to tear the walls down in case of accident or fire.



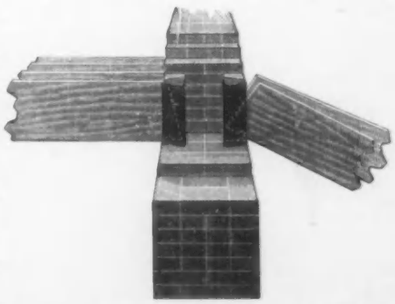
The Goetz Box Anchor is a new form for anchoring joists to a wall, consisting of a cast-iron box in which the joists at intervals of six feet apart are fastened to the wall. A lug in the bottom of box and a notch in the joist form the tie from wall to wall. It can be easily seen that any deflection of the joist will simply separate the tie, allowing the joist to fall while the box remains in the wall.



Government tests have been made in which the notch placed three and one half inches from the end was found to equal five wrought nails in strength, such as are usually used to fasten the old-style strap. Some importance is attached to the necessity of properly building the box into the wall, and as this part of the work belongs to the mason, he should understand what the object to be accomplished is, and then he will better understand what he must do. The boxes are usually placed in position on the joist by the carpenter, and the mason in walling up around it should see that a line of headers comes within the height of the boxes. He should also arrange his brick in such a manner that it will be impossible to remove the box from the wall. It is not necessary to cut any bricks, but it is important that the joints next to the box be well filled with mortar or cement.



It is usually a difficult matter to properly anchor an old wall that is to be used as a parti-wall. In many cases no attempt is made to anchor such a wall. With this method it is comparatively easy to do. In cutting the niches into the wall, both sides of the hole should be cut on the same angle as is found on the box anchors. The hole should be made large enough to admit the box. After placing in position, the extra space at the side of the box should be filled with cement. In this way an anchorage is formed with the wall that cannot be displaced or torn out.



These box anchors are made in many forms to suit the size of timbers, and for heavy girders the base plate is extended outwardly, forming a good bearing on the wall. Air spaces are also provided which permit a circulation of air around the timber and thereby prevent dry rot. If the timber is wet or unseasoned it has a chance to dry out after being put in. These also afford protection against fire from defective flues, as the joist ends are covered by a ventilated iron box.

The company introducing this invention have agencies established in nearly every large city, who will estimate and furnish the castings delivered at the building. The castings are so simple that any foundry can make them. We understand that over one hundred buildings are now supplied with this new device, which is the best proof of its utility.

BOOK NOTICES.

A TREATISE ON MASONRY CONSTRUCTION, by Ira O. Baker, C. E., Professor of Civil Engineering in the University of Illinois. Sixth edition. New York, John Wiley & Sons.

The sixth edition of Prof. Baker's standard treatise hardly needs more than to be mentioned. The parts of this useful book with which THE BRICKBUILDER is directly concerned, while short, contain much valuable matter. The chapter on brick treats of the processes of manufacture, the classification of brick with the qualities and properties of each class, the requisites for good brick, methods of testing, absorbing power, strength, and sizes of brick. Chapter VIII., on Brick Masonry, treats of the relation of mortar to the strength of brickwork, of the various bonds, of compressive and transverse strength, of measurement of brickwork, of estimates and specifications, of the comparative value of brick and stone masonry, of efflorescence in brickwork, and methods of making brick impervious to water. In relation to the bond of brick it is worth noting that what we call English bond, like "English breakfast tea," is peculiar to this country. In England, the English bond is always a course of headers and a course of stretchers in alternate courses, yet the specifications of the Atchison, Topeka & Santa Fé Railroad as here quoted speak of "the ordinary English bond, five stretcher courses to one header course." What the author says of the comparative merits of brick and stone we venture to quote in full: —

"Brick masonry is not much used, except in the walls of buildings, in lining tunnels, and in constructing sewers, the general opinion being that brickwork is in every way inferior to stone masonry. This belief may have been well founded when brick was made wholly by hand, by inexpert operatives, and imperfectly burned in the old-time kilns, the product being then generally poor; but things have changed, and since the manufacture of brick has become a business conducted on a large scale by enterprising men, with the aid of a variety of machines and improved kilns, the product is more regular in size and quality, and stronger than formerly. Brick is rapidly displacing stone for the largest and best buildings in the cities, particularly in Chicago and St. Petersburg, where the vicissitudes of the climate try masonry very severely. There are many engineering structures in which brick could be profitably employed instead of stone, as, for example, the walls of box-culverts, cattle-guards, etc., and the less important bridge piers and abutments, particularly of highway bridges.

"Brickwork is superior to stone masonry in several respects, as follows: 1. In many localities brick is cheaper than stone, since the former can be made near by, while the latter must be shipped. 2. As brick can be laid by less skilful masons than stone, it costs less to lay it. 3. Brick is more easily handled than stone, and can be laid without any hoisting apparatus. 4. Brick requires less fitting at corners and openings. 5. Brick masonry is less liable to great weakness through inaccurate dressing or bedding. 6. Brickwork resists fire better than limestone, granite, or marble; sandstone being the only variety of stone that can compare with brick in this respect. 7. Good brick stands the effect of weathering and of the acids in the atmosphere better than sandstones, and in durability even approaches some of the harder stones (see §§ 31–33). 8. All masonry fails when the mortar in its joints disintegrates or becomes dislodged, therefore brick masonry will endure the vicissitudes of weather as well as stone masonry, or even better, since the former usually has thinner joints."

We doubt if the belief "that brickwork is in every way inferior to stone masonry" was ever "well founded." Witness, for instance, the numerous brick buildings of ancient Rome and mediæval Europe. In engineering works brick is much more used in Europe than with us, especially in England, and with us, as Prof. Baker admits, brick might often with advantage be used in place of iron. In the paragraph on efflorescence we find no mention of some of the more recent methods proposed for making brick walls impervious to water, such as Caffall's and Cabot's processes. Some comparisons of these with Sylvester's method, which is described, would have been of value.